

CLAIMS

What is claimed is:

1. A method of acquiring 3D color information, comprising:
 - using a common light source and a pattern light source to respectively acquire a texture
 - 5 image and a pattern image, wherein the pattern light source has more than 3 basic colors;
 - analyzing the color composition of an object by the pattern image;
 - calculating corresponding locations of color strips of the pattern light source in the pattern image by boundary detection;
 - determining colors of the pattern image relative to the pattern light source;
 - 10 correcting colors of the pattern image relative to the pattern light source to obtain data for the profile of the object;
 - calculating a 3D model of the object; and
 - obtaining the 3D model of the object from the color composition, the topography and the profile data of the object.
- 15 2. The method of claim 1, wherein calculating corresponding locations of color strips of the pattern light source in the pattern image by boundary detection further comprising:
 - mapping the pattern image to coordinates;
 - passing the pattern image through a pass a low-pass filter;
 - undergoing a gradation detection of the brightness of the pattern image to obtain peaks
 - 20 and troughs in the brightness distribution; and
 - finding corresponding locations of color strips of the pattern light source in the pattern

image.

3. The method of claim 2, wherein mapping the pattern image to coordinates separates hues from color brightness.

5 4. The method of claim 1, wherein correcting colors of the pattern image relative to the pattern light source to obtain data for the profile of the object further comprising:

determining whether the colors are correctly evaluated;

correcting the color strips;

correcting the encoding of the color strips; and

obtaining correct sequences of color strips.

10 5. The method of claim 4, wherein correcting colors of the pattern image relative to the pattern light source to obtain data for the profile of the object separates hues from color brightness.

6. A 3D color information acquisition apparatus for acquiring a 3D model of an object, the apparatus comprising:

15 an image pickup device for acquiring a projected image and a pattern image for the object;

a laser-positioning device for evaluating a distance between the image pickup device and the object;

20 a common light source, providing the light for the image pickup device to acquire the projected image;

a pattern light source for providing the light for the image pickup device to acquire the pattern image, wherein the pattern has more than 3 basic colors with different color

composition and combination; and

a switch module, used to selectively switch between the common light source and the pattern light source.

7. The apparatus of claim 6, wherein the image pickup device is a digital camera.

5 8. The apparatus of claim 6, wherein the pattern light source includes a pattern film slide and a pattern projector to project the pattern light on a target object.

9. The apparatus of claim 6, wherein the common light source is a flash.

10. The apparatus of claim 6, wherein the pattern has 6 basic colors.

11. The apparatus of claim 6, wherein the color composition of the pattern is unique and
10 within the boundary of the pattern.

12. The apparatus of claim 6, wherein the color combination is made by a rule of a predetermined color sequence.

13. A method of acquiring 3D color information, wherein a common light source and a pattern light source are used to respectively acquire a projected image and a pattern image to
15 obtain a 3D model of an object, wherein the pattern light source provides a pattern constructed by more than 3 basic colors, and generating the pattern comprising:

providing a primary encoding unit;

adding one of the basic colors behind the primary encoding unit to form a new encoding unit;

20 confirming whether the new encoding unit follows a predetermined color sequence;

putting the new encoding unit in a corresponding cluster according to an evaluation result; and

repeating the above steps to correctly locate all the encoding units.

14. The method of claim 13, wherein at confirming whether the new encoding unit follows a predetermined color sequence, the predetermined color sequence includes a series of colors in specific order.

5 15. The method of claim 13, wherein one encoding unit is spaced from other encoding units in the same cluster at a predetermined distance.

16. The method of claim 13, wherein the pattern is constructed by 6 colors.